

Stationary Power Distribution Unit (SPDU) 3-phase, 75-300 kVA

Installation Manual

APC's Stationary Power Distribution Unit (SPDU) was designed for application in various 3-phase environments. The SPDU can provide up to 11 sub-feed breakers, and offers the option of increasing the number of panel boards by adding side cars. Top and bottom cable entry is standard. Other features include total front accessibility, K1-K20 isolation transformers, and protective shielding.

Read this manual in its entirety before installing or operating the SPDU. Proper installation, operation, and maintenance are necessary to ensure continued satisfactory performance from the equipment. This unit was manufactured and tested in accordance with current industry standards.



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Safety

Safety warnings



- **ONLY QUALIFIED PERSONNEL** are permitted to perform any task or function associated with the SPDU and its related equipment.
- This installation **MUST COMPLY** with the requirements of ANSI/NFPA 75 and NEC/NFPA 79 Art. 645.
- All safety codes, safety standards, and/or regulations must be strictly observed during installation and ongoing maintenance of this equipment.



- Ensure that **NO ELECTRICAL POWER SUPPLY** is connected to the SPDU and that **ALL BREAKERS** are in the **OFF** position before installing or servicing the SPDU and any of its optionally ordered sidecars.
- All wiring instructions must be followed precisely. Failure to comply could result in permanent damage to the equipment.
- The SPDU was designed to operate within its nameplate ratings. Operation outside of these ratings may cause the equipment to fail.
- The SPDU contains several built-in safety features that are intended to reduce hazards to operating personnel. **UNDER NO CIRCUMSTANCES** should any safety feature be rendered inoperative.

Live maintenance precautions

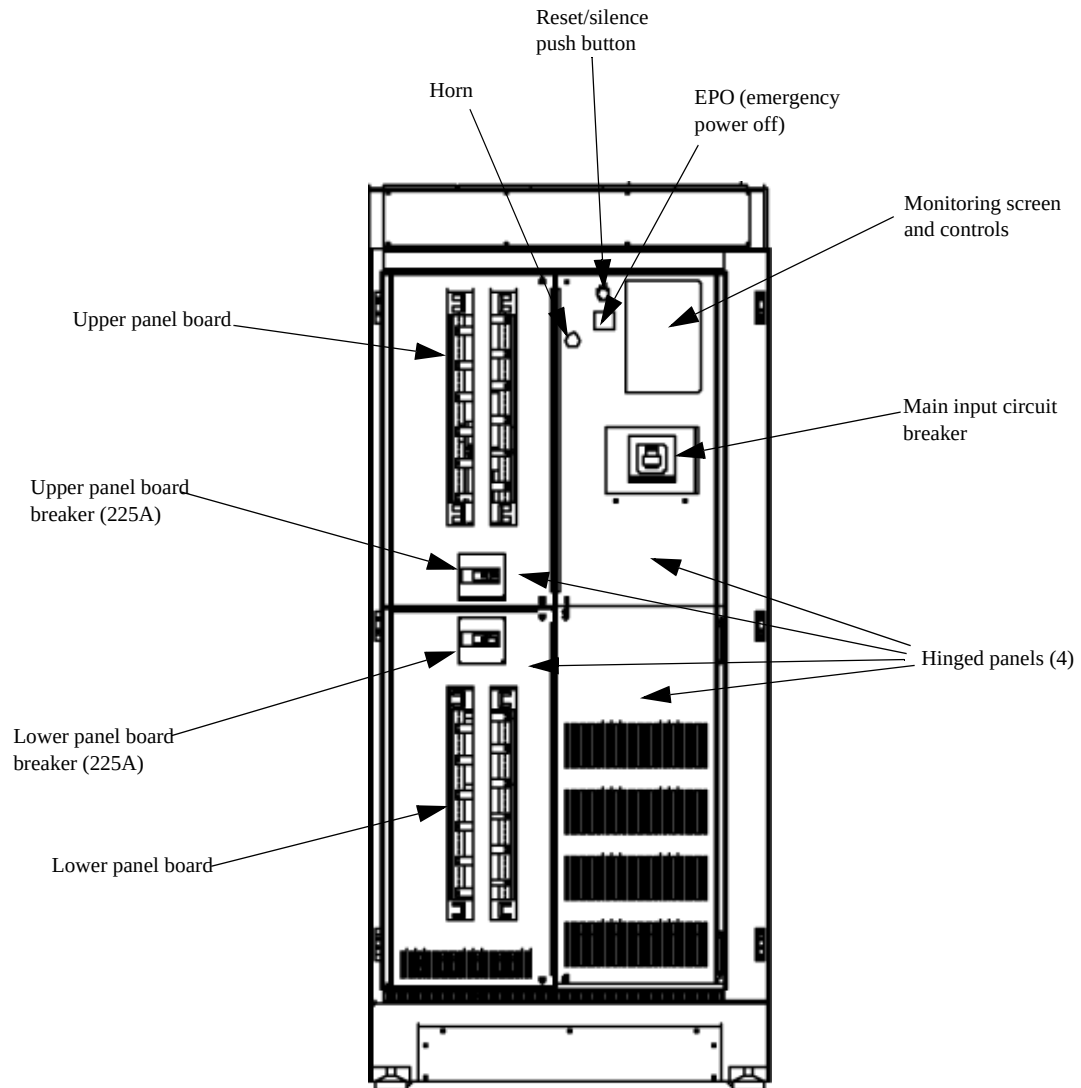
APC does NOT recommend live maintenance of the SPDU. However, APC is aware that due to the critical nature of data center loads, live maintenance may occur. If performing live maintenance, observe the following precautions to reduce the risk of electric shock.



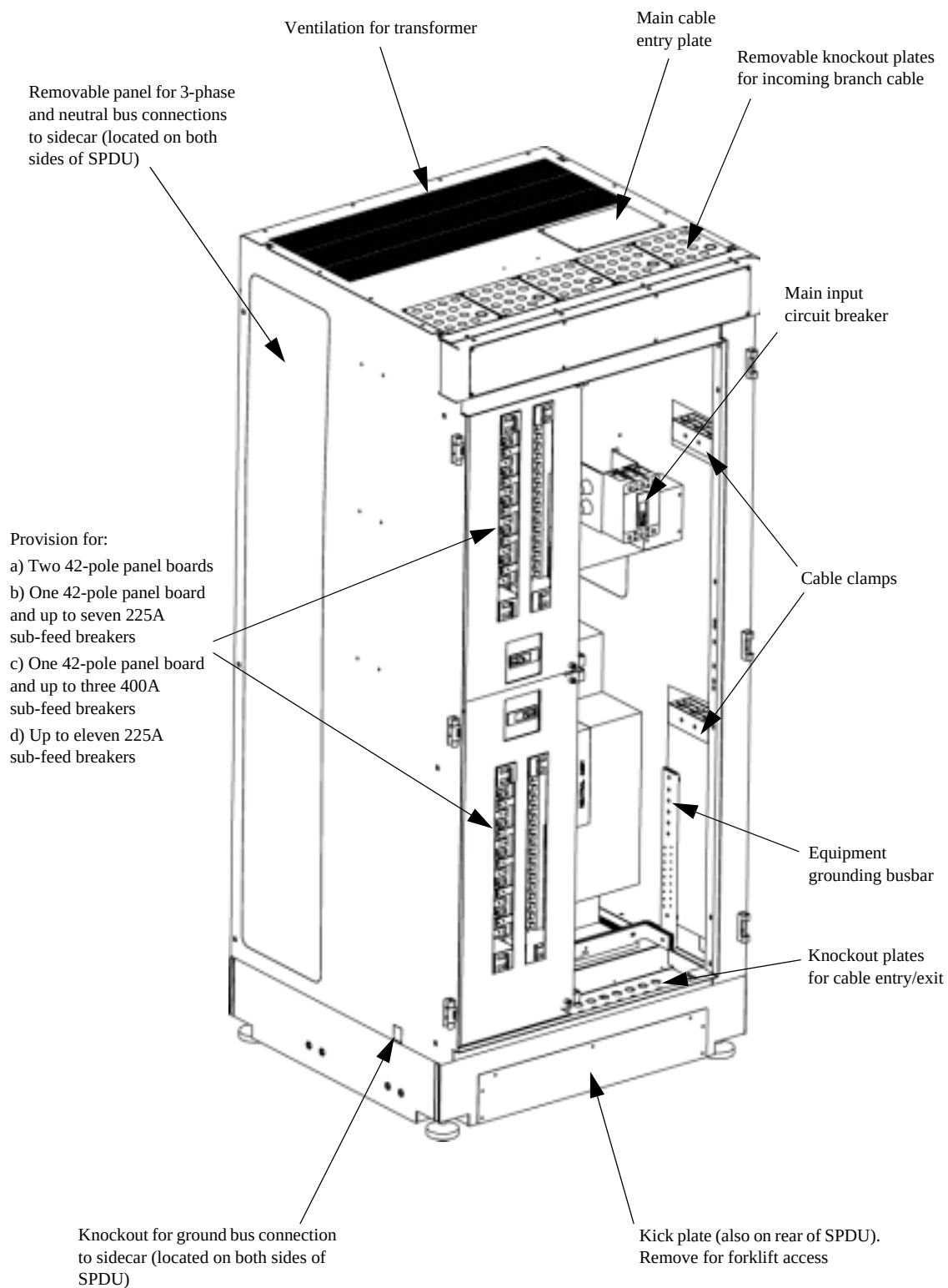
1. Never work alone.
2. Only a certified electrician who is trained in the hazards of live electrical installation should perform the maintenance.
3. Know the procedure for disconnecting electricity to the SPDU and to the data center in the event of an emergency.
4. Use rubber-insulated gloves and rubber-insulated boots.
5. Use double-insulated tools. If double-insulated tools are not available, insulate all tools with electrical tape.
6. Use electrical tape to insulate any non-insulated conductive parts.

SPDU Overview

External components



Internal components



Custom configurations and options

APC's SPDUs are "built to order" as a means of satisfying each customer's unique requirements. The customer is thus able to select an appropriate SPDU model, along with whatever features and options they would like to have incorporated into that model.

Product SKUs. A total of 21 SPDU product SKUs are available. The SKUs are broken down into seven levels of output power (75, 100, 125, 150, 200, 225 or 300 kVA) and three types of transformers (K1, K13 or K20). The first set of numbers appearing in the SKU refers to the output power and the last set references the transformer type (i.e., PD125G6K13).



For weights and dimensions of SPDUs that have been pre-equipped with one sidecar attachment, refer to page 34.

Note

Product SKU	Width		Depth		Height		Weight	
	IN	CM	IN	CM	IN	CM	LB	KG
PD75G6FK1	36	91	32	81	81.5	207	1270	576
PD75G6FK13	36	91	32	81	81.5	207	1320	599
PD75G6FK20	36	91	32	81	81.5	207	1340	608
PD100G6FK1	36	91	32	81	81.5	207	1525	692
PD100G6FK13	36	91	32	81	81.5	207	1550	703
PD100G6FK20	36	91	32	81	81.5	207	1695	769
PD125G6FK1	36	91	32	81	81.5	207	1555	705
PD125G6FK13	36	91	32	81	81.5	207	1600	725
PD125G6FK20	36	91	32	81	81.5	207	1715	778
PD150G6FK1	36	91	32	81	81.5	207	1590	721
PD150G6FK13	36	91	32	81	81.5	207	1700	771
PD150G6FK20	36	91	32	81	81.5	207	1960	889
PD200G6FK1	36	91	32	81	81.5	207	1900	862
PD200G6FK13	36	91	32	81	81.5	207	2100	953
PD200G6FK20	36	91	32	81	81.5	207	2100	953
PD225G6FK1	36	91	32	81	81.5	207	2100	953
PD225G6FK13	36	91	32	81	81.5	207	2300	1043
PD225G6FK20	36	91	38.5	98	81.5	207	2350	1066
PD300G6FK1	45	114	38.5	98	81.5	207	2300	1043
PD300G6FK13	45	114	38.5	98	81.5	207	2700	1225
PD300G6FK20	45	114	38.5	98	81.5	207	2900	1315

Dual-feed main breakers. The SPDU can be equipped with any of five types of dual-feed main breakers:

- 225A (p/n PDCBRF225)
- 400A (p/n PDCBRK400)
- 600A (p/n PDCBRL600)
- 800A (p/n PDCBRM800)
- 1200A (p/n PDCBRN1200)

Panel boards/sub-feed breakers. The SPDU can be equipped with any of the following combinations of panel boards/sub-feed breakers:

- Two 42-pole panel boards (2 x p/n PDPNLPL1A)
- One 42-pole panel board and up to seven 225A sub-feed breakers (1 x p/n PDPNLPL1A and 7 x p/n PDCBRF225SF)
- One 42-pole panel board and up to three 400A sub-feed breakers (1 x p/n PDPNLPL1A and 3 x p/n PDCBRK400SF)
- Up to eleven 225A sub-feed breakers (11 x p/n PDCRBF225SF)



The terminology “up to...” refers to the maximum number of sub-feed breakers available in that particular combination. Lesser numbers can also be provided.

Note

Sidecars. One or more sidecars (p/n PDSC100 for 75-225[K13] kVA units, and p/n PDSC300 for the 225[K20] unit and all 300kVA units) can optionally be attached to the main unit (via hard bus) to increase the SPDU’s load distribution capability. The customer must also decide whether to add one or two 42-pole panel boards (p/n PDPNLPL1A) to each optionally ordered sidecar. Sidecars can be attached to either or both sides of the SPDU and daisy-chained, if necessary.



The number of sidecars that can be added to a single SPDU is limited only by the size of the transformer and the maximum available current.

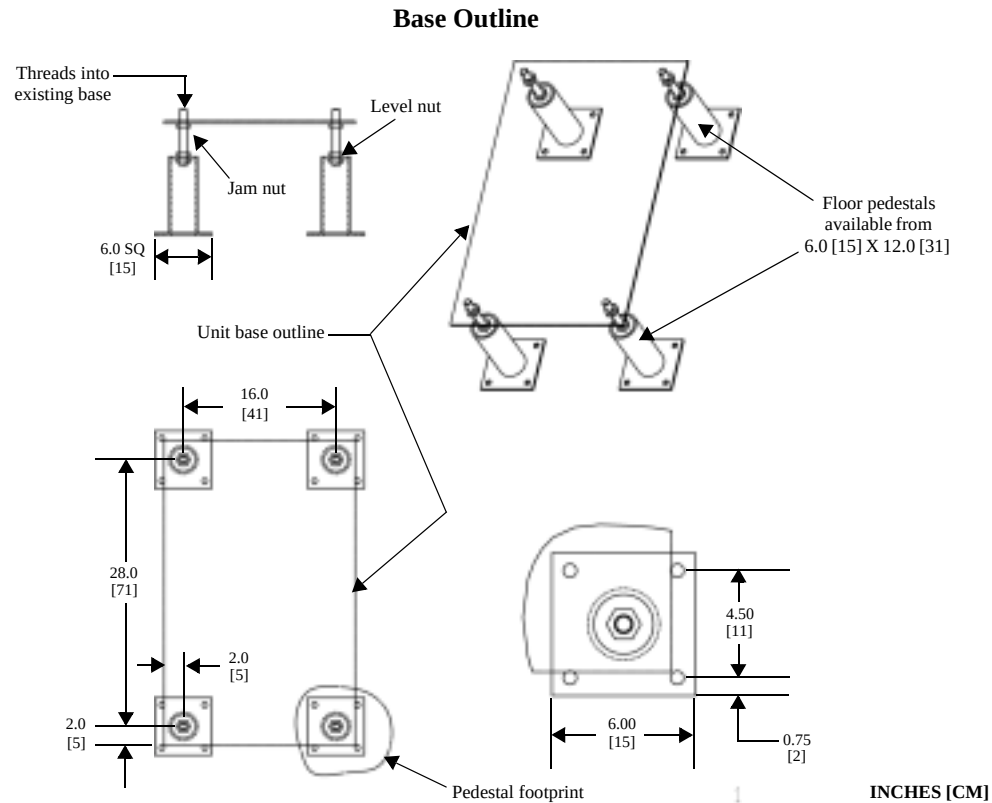
Note

Manual restart. Manual restart (p/n PDMRS100) is optionally available as an alternative means of restarting the SPDU in the event input power is lost. The manual restart circuit automatically energizes the shunt trip mechanism in the main input circuit breaker.

Transient voltage suppression system (TVSS). A transient voltage suppression system or TVSS (various models are available) can be connected at either the input source or at the output from the local panel boards. The TVSS protects the load by clipping voltage transients before they reach the SPDU or the load.

Custom painting. While the standard SPDU color is basic black, the unit can optionally be painted (p/n PDCP100) any other color.

Floor jacks. A set of (four per unit) floor jacks (p/n PDFJ100) can optionally be applied to the SPDU (and its attached sidecar(s)) to provide leveling and/or additional clearance for bottom cable feed. The jacks are offered in heights of up to 18 inches, and are adjustable from one to three inches above the base. Refer to the installation steps below.

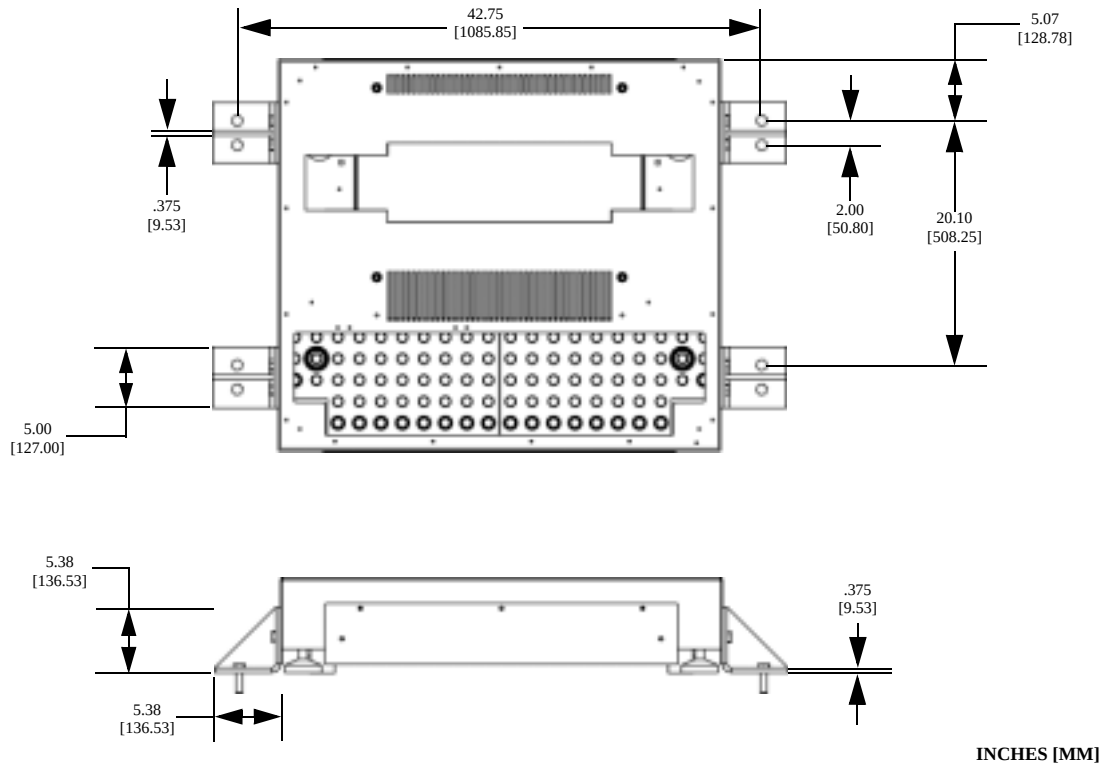


1. Screw pedestal assembly into bottom base and use jam nut to lock shaft into base. Ensure shaft is fully engaged in base nut.
2. Lower pedestal to floor by rotating pedestal assembly using top nut.
3. Once levelled, secure to floor using 3/8" hardware in 9/16" diameter holes. Refer to drilling plan above.

Full-frame floor stand. A full-frame floor stand (p/n PDFS100 for 75-225[K13] kVA units, and p/n PDFS130 for the 225[K20] unit and all 300 kVA units) can optionally be applied to the SPDU (and each of its attached sidecar(s)) to provide leveling and bottom cable access independent of a raised floor. The floor stand is constructed of welded steel, and is offered in heights of up to 32 inches (with an adjustment range of +/- 3 inches).

Seismic bracing. Seismic bracing (p/n PDSB100) is optionally available as a means of securing the base frame of the SPDU (and sidecar) enclosure(s) to a concrete floor for those installations where additional stability is either required or desired.

The diagram below shows the proper floor bracket placement and bolt locations for achieving seismic bracing on the 75-225[K13] kVA enclosure. Contact APC for hardware and torque specifications to meet various zone requirements. Seismic diagrams for the 225[K20] unit, the 300 kVA units, and each of the sidecar offerings are provided, as needed, with the Installation Drawings.



Monitoring. Three levels of SPDU monitoring are available:

- **Basic** (p/n PDBMN100). Continuously monitors the temperature of the transformer, the status of the main input circuit breaker, and the status of a remote alarm contact. Local audio and visual alarms are initiated when the core temperature of the transformer exceeds maximum parameters. The main circuit breaker is then tripped or the remote alarm contact is closed.
- **Advanced** (p/n PDAMN100). Uses a microprocessor-based power monitor that is capable of sensing, processing, and locally displaying information relating to output voltages for all three phases of line-to-line and line-to-neutral circuitry; all three phases of output current, output frequency and output power; as well as minimum and maximum acceptable values.
- **Premium** (p/n PDPMN100). Also uses a microprocessor-based power monitor capable of sensing, processing, and displaying an extensive array of operational data. This level additionally allows both local and remote access to information relating to output voltages for all three phases of line-to-line and line-to-neutral circuitry; all three phases of output current, output neutral, output ground, output frequency, and output power; as well as minimum and maximum values, K factor, crest factor, discrete input and output status, analog input readings, and any combination of up to seven metered values.



Note

- **The above-described levels should NOT be considered the only options available for SPDU monitoring. Various elements of each can be mixed and matched to create the best-possible solution for each customer.**
- **Refer to “Appendix C: Monitoring” on page 37 for further information regarding the functionality of SPDU monitoring options.**

Other SPDU features

Emergency power off (EPO). The emergency power off (EPO) push button is located at the front of the SPDU, beneath a protective cover. It is typically used in emergency situations to immediately shut down the unit by disconnecting all power downstream of the main input circuit breaker.

Remote emergency power off (REPO). Remote emergency power off (REPO) can be implemented at a location apart from the SPDU. When activated, it sends a command signal for the SPDU to initiate an EPO condition.

Receiving and Transporting

Shipping

Each SPDU (with up to one sidecar attachment) is shipped on its own pallet. Additional sidecars are shipped two units to a pallet. For safety, pallets are slotted to allow forklift access from only one direction. The enclosures are likewise designed to accommodate forklift movement.

To further stabilize the enclosures during shipping, (2) metal angle brackets connect the base of each unit to its pallet. Packaging materials are employed to minimize the effects of impact.

Receiving

Check for damages.

1. Upon receipt, inspect the shipment for obvious signs of rough handling and/or external damage.
 - *DO NOT remove the packaging materials until the unit is off its pallet and ready for installation.*
 - *DO NOT remove the enclosure from its shipping pallet until all forklift movement is completed.*
 - *A thorough internal inspection should be conducted only after the enclosure has been positioned for installation, and prior to making electrical connections.*
2. Record any external and/or internal damage observed and call the carrier immediately to allow their personnel to conduct an equipment inspection.
 - *DO NOT contact APC first — notify the carrier instead. Otherwise, APC may be unable to assist in recovering the realized amount of the claim.*
 - *All damage claims should be as specific as possible. Information pertaining to the shipment should appear on the shipping label and related paperwork.*
 - *BE SURE to request a copy of the carrier's inspection report.*

Check for discrepancies. The receiver should make certain the shipment has arrived in its entirety. Compare information from the shipping label against what has actually been received. If anything is missing, contact APC immediately (appropriate phone numbers are provided at rear of document).

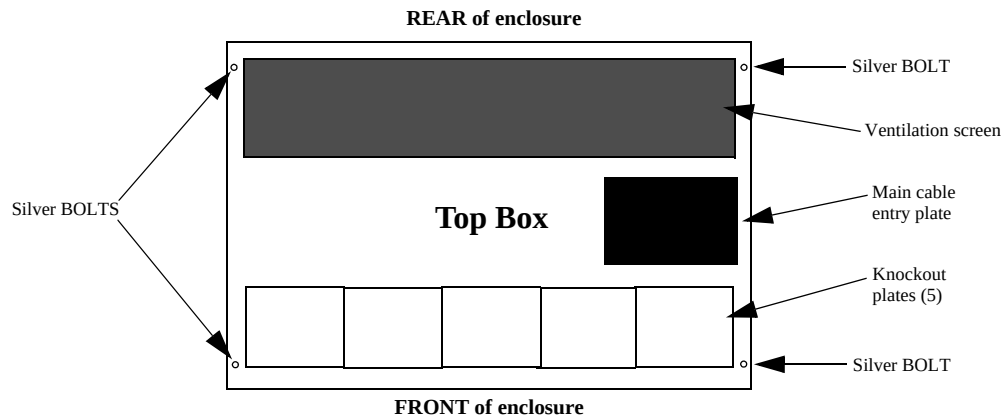
Transporting

Exercise caution. When transporting enclosures, try to avoid impact. Even the best packaging cannot guarantee equipment protection. In addition, keep personnel clear of an enclosure in transport. The units are heavy and can cause serious bodily injury.



For size and weight information, refer to “Product SKUs” on page 4 or “SPDU with one sidecar” on page 34.

Top box removal. Should the SPDU’s (and/or the sidecar’s) height exceed the doorway(s) by less than 5.5 inches (14 cm), the unit’s Top Box can be removed to gain clearance. Using a large standard screwdriver, detach the (4) silver ¼-20 x 6” bolts located at the overhead corner positions. Removing the top box will reduce the unit’s height to 76 inches (193 cm). Once the SPDU (or sidecar) is in position and cleared of all doorways, re-attach the top box using the same four bolts.



Storage

The SPDU is not suited for outdoor storage, and the equipment warranty may not be applicable under such circumstances. If the equipment must be stored, it should be stored indoors and with its protective packaging still in place.

- The equipment should be kept in a climate-controlled environment with a temperature range of 0° to 40°C (32° to 104°F) and a relative humidity of 0% to 95%, non-condensing.
- The equipment must be protected at all times from excessive moisture, construction dirt, corrosive elements, and other contaminants. The enclosure (still on its pallet, if possible) should be set on a firm and level surface.
- Make sure the equipment does not exceed floor loading requirements. For size and weight information, refer to “Product SKUs” on page 4 or “SPDU with one sidecar” on page 34.
- DO NOT, under any circumstances, stack other equipment on top of the enclosure.

Installation Considerations

Site requirements

- The equipment should be kept in a climate-controlled environment with a temperature range of 0° to 40°C (32° to 104°F) and a relative humidity of 0% to 95%, non-condensing.
- The equipment must be protected at all times from excessive moisture, construction dirt, corrosive elements, and other contaminants.
- Make sure the floor's surface is firm and level, and equipment does not exceed floor loading requirements. For size and weight information, refer to “Product SKUs” on page 4, “SPDU with one sidecar” on page 34, or “SPDU with two sidecars” on page 35.

Required tools

The following tools are required for installation of the SPDU and its sidecars (if employed):

- | | |
|-------------------------|---|
| • Ratchet set w/sockets | • Open end/box wrenches |
| • Torque wrench | • Standard screwdrivers (small and large) |
| • Phillips screwdrivers | • Wire stripper |



When performing “live maintenance” always use double-insulated tools. If double-insulated tools are not available, insulate all tools with electrical tape.

Clearances

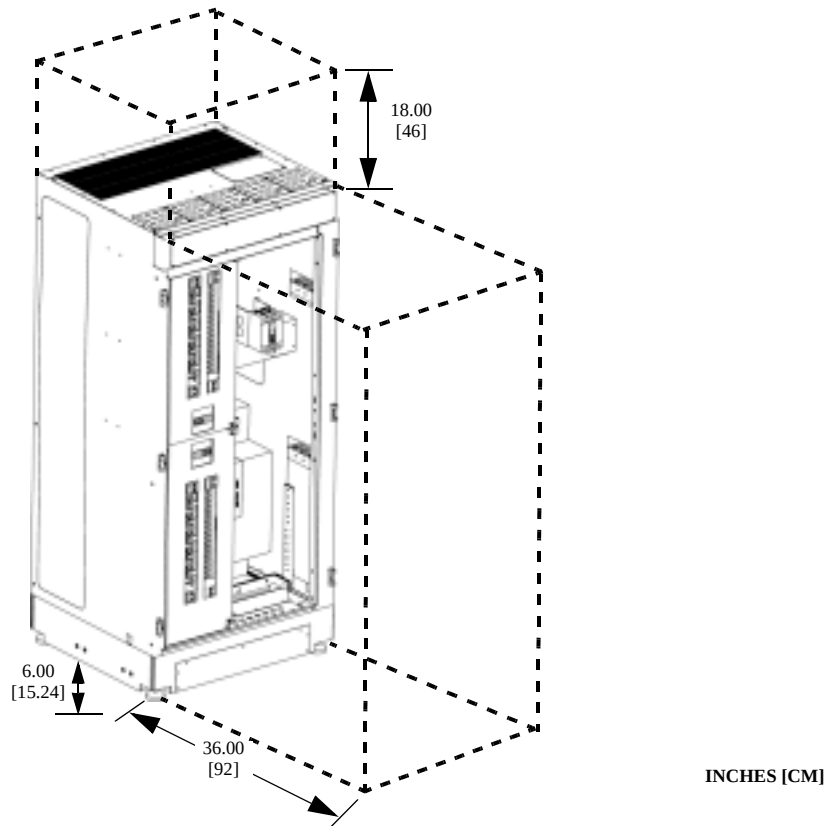
When placing the SPDU (and sidecars, if used) for installation, make certain each enclosure adheres to the following recommendations:

- A FRONT clearance of at least thirty-six inches (36") is recommended for front-access servicing.
- A TOP clearance of at least eighteen inches (18") supports ventilation.
- A BOTTOM clearance of at least six inches (6") is recommended for accessing cables and enhancing ventilation (refer to graphic on page 13 for typical raised floor cutout dimensions).
- There are no special requirements for REAR clearance.



Note

- **Local and national codes supersede recommended levels of clearance.**
- **If the floor is not raised or fails to meet bottom clearance criteria, optional floor jacks or a full-frame floor stand (both described on page 6) may be used.**

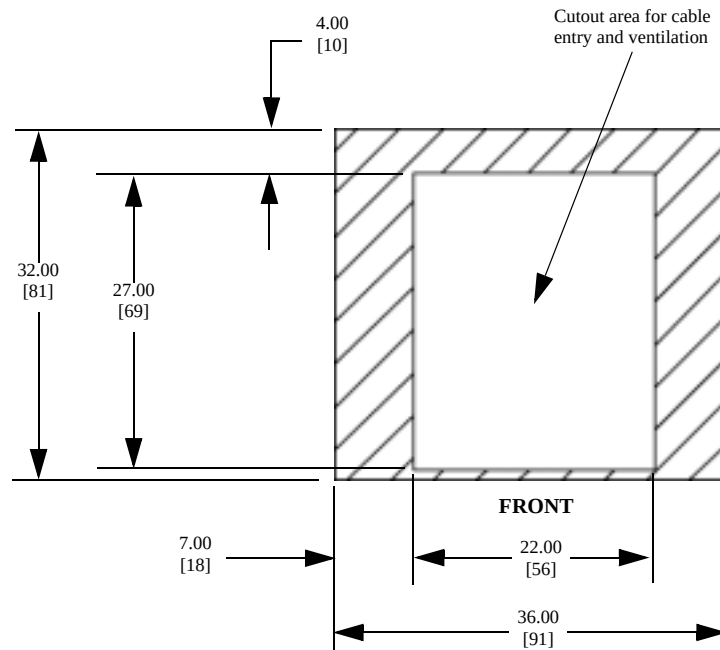


Placement

Follow these instructions when placing enclosures:

1. Decide where the enclosure(s) will be placed and prepare the appropriate floor cutout(s), if necessary. Floor jacks or a full-frame floor stand (both are described on page 6) might optionally be used to attain recommended bottom clearance.

The cutout for the 75-225[K13] kVA SPDUs is shown below. The cutout for the 225[K20] SPDU and the 300 kVA SPDUs is provided, as needed, with the Installation Drawings.



INCHES [CM]

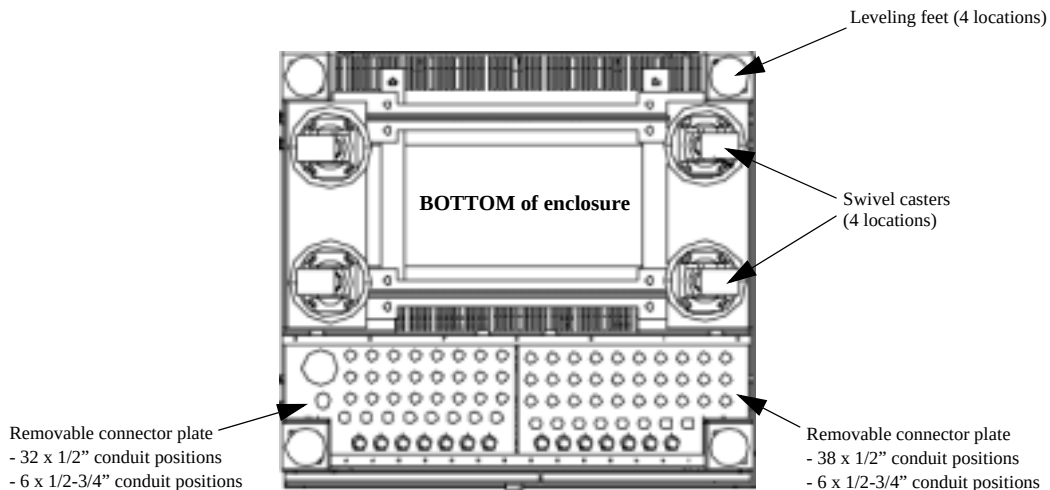


Make certain cutouts do not compromise the structural integrity of the floor, and that loading requirements remain acceptable to the installation.

Note

2. Set the pallet containing the enclosure(s) on a firm and level surface as close as possible to the unit's final installation location.
3. Remove the packaging material.
4. Using a ratchet and socket, remove the (2) metal angle brackets securing the base of the enclosure(s) to the pallet.
5. Use a Phillips screwdriver to remove both front and back kick plates. Refer to "Internal components" on page 3 for location of kick plates.

- Using a forklift, carefully lift the enclosure off its pallet and onto the floor. Now on casters, the unit can be rolled to its final position.



- Once the enclosure is on the floor, it may begin to roll. The unit's movement must be controlled to ensure the safety of nearby personnel.
- NEVER stand on or in any of the enclosures. The unit may tip, which could cause serious injury and/or damages.

- Roll the enclosure to the location where it will be installed.



Roll enclosure over sheets of 3/4" plywood when crossing a computer room floor. The plywood will distribute the weight evenly to protect against floor damage.

- Position enclosure over floor cutouts. Take care to avoid casters falling through cutouts. Floor jacks or a floor stand might optionally be used, as indicated in step 1.
- Using a wrench, lower the (4) leveling feet until they make contact with the floor. Refer to the graphic in step 6 above for location of leveling feet.
- Replace kick plates at front and rear of unit only after all wiring has been completed.

SPDU Installation



- Ensure that **NO ELECTRICAL POWER SUPPLY** is connected and that **ALL BREAKERS** are in the **OFF** position before installing the SPDU.
- **ALL WIRING INSTRUCTIONS** must be followed precisely. Failure to comply could result in permanent damage to the equipment.

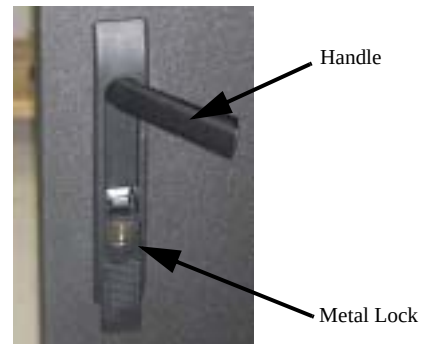
Accessing the SPDU

Front doors.

- A handle mechanism interlocks the two front doors of the enclosure. Front door keys are tie-wrapped to the protective cover of the EPO button.

To open the front doors:

1. Pull down the bottom part of the mechanism to expose the metal lock slot.
2. Insert front door key into metal lock and make a one-quarter turn to the right. This will release the handle.
3. Move the handle to either side to open door.



- The front doors can be removed by: a.) opening each door in turn, b.) removing its hinge pin, and c.) lifting the door away from the hinge. Once doors have been removed, make sure the hinge pins are stored in a safe place for later use.
- The removed front doors must be restored prior to placing the SPDU into service.

Hinged panels. Behind the front door are four hinged panels. Each panel can be opened by loosening its top and bottom turn screws, and then re-secured by tightening these same screws.

Knockouts.

- On top of the SPDU are six (6) removable plates: five (5) knockout plates for output cables and one (1) main input cable entry plate. All are held in place with 10-32 x 3/4" captive screws.



To avoid cable congestion and facilitate future loads, top knockouts nearest the front and center of the enclosure should be utilized first.

- At the bottom of the SPDU are two (2) removable plates. These contain knockouts for connecting cables to the panel board and/or sub-feed breakers. Refer to “Internal components” on page 3 and the step 6 graphic on page 14.



Power cables MUST NOT run near any control wiring. Leave a minimum 1” clearance between cables and wires.

- The final arrangement of knockouts will correspond to the customer’s chosen configuration.

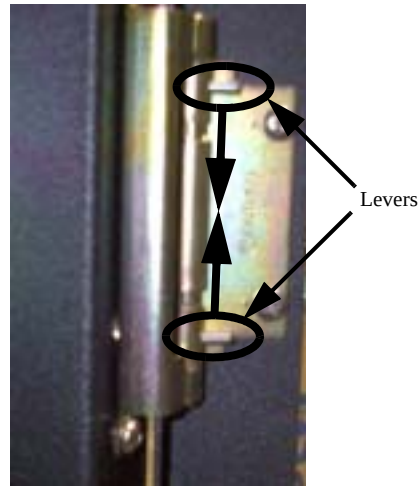
Removing trim. The sub-feed breaker trims are located behind the front doors.

To remove trim:

- Squeeze the upper and lower levers together.
- Turn inward, release, and lock in place.
- Pull the trim toward you.

To restore trim:

- Slot the movable trim into the stationary trim.
- Squeeze the upper and lower levers together.
- Turn outward and release.
- The hinge pins should spring back into place.



Note

- Before removing trim, disconnect the ground straps. Store trim in a safe area to prevent injury to personnel or damage to the SPDU.
- Trim must be restored and ground straps reconnected prior to placing the SPDU into service.

Wiring the SPDU

Wiring considerations.

- Because all electrical and mechanical connections can be accessed from the front of the SPDU, junction boxes are not required. A dedicated feeder should provide the necessary 3-phase input power to the unit.
- Conductors are coded as follows:

Conductor	Code
Phase A	L1
Phase B	L2
Phase C	L3
Ground	Green
Neutral	White

- Those circuits connected to the SPDU distribution breakers should be configured so that the load is equally balanced across the three phases.
- All conductors must comply with NEC and other applicable codes. Refer to the table below for typical conductor sizes, and then refer to “Torque values” on page 19. Conductor sizes relate to NEC 1996 Table 310-16 using 75° copper conductors. Recommended torque values should be used unless otherwise specified.

Input volts kVA		Units with transformers			Units without transformers		
		Input FLA*	Main breaker	Suggested wire size (AWG)	Input FLA*	Main breaker	Suggested wire size (AWG)
208	75	208	250A	250 MCM	208	250A	250 MCM
	100	278	350A	500 MCM	278	350A	500 MCM
	125	347	450A	(2) 4/0	347	450A	(2) 4/0
	150	416	600A	(2) 350 MCM	416	600A	(2) 350 MCM
240	75	180	225A	4/0	N/A	N/A	N/A
	100	241	300A	350 MCM	N/A	N/A	N/A
	125	301	400A	(2) 4/0	N/A	N/A	N/A
	150	361	450A	(2) 4/0	N/A	N/A	N/A
380	75	114	150A	1/0	114	150A	1/0
	100	152	200A	3/0	152	200A	3/0
	125	190	250A	250 MCM	190	250A	250 MCM
	150	228	300A	350 MCM	228	300A	350 MCM
	200	304	400A	(2) 4/0	304	400A	(2) 4/0
	225	342	450A	(2) 4/0	342	450A	(2) 4/0

Input volts	kVA	Units with transformers			Units without transformers		
		Input FLA*	Main breaker	Suggested wire size (AWG)	Input FLA*	Main breaker	Suggested wire size (AWG)
400	75	108	150A	1/0	108	150A	1/0
	100	144	200A	3/0	144	200A	3/0
	125	180	225A	4/0	180	225A	4/0
	150	217	300A	350 MCM	217	300A	350 MCM
	200	289	400A	(2) 4/0	289	400A	(2) 4/0
	225	325	400A	(2) 4/0	325	400A	(2) 4/0
415	75	104	150A	1/0	104	150A	1/0
	100	139	175A	3/0	139	175A	3/0
	125	174	225A	4/0	174	225A	4/0
	150	209	300A	350 MCM	209	300A	350 MCM
	200	278	400A	(2) 4/0	278	400A	(2) 4/0
	225	313	400A	(2) 4/0	313	400A	(2) 4/0
480	75	90	125A	1	N/A	N/A	N/A
	100	120	150A	1/0	N/A	N/A	N/A
	125	150	200A	3/0	N/A	N/A	N/A
	150	180	225A	4/0	N/A	N/A	N/A
	200	241	300A	350 MCM	N/A	N/A	N/A
	225	271	350A	500 MCM	N/A	N/A	N/A
	300	361	450A	(2) 4/0	N/A	N/A	N/A
600	75	72	90A	3	N/A	N/A	N/A
	100	96	125A	1	N/A	N/A	N/A
	125	120	150A	1/0	N/A	N/A	N/A
	150	144	200A	3/0	N/A	N/A	N/A
	200	192	250A	250 MCM	N/A	N/A	N/A
	225	241	300A	350 MCM	N/A	N/A	N/A
	300	289	400A	(2) 4/0	N/A	N/A	N/A

* FLA = Full load amps

Torque values. Because various types of breakers are used in these assemblies, consult the breaker nameplate for actual torque values based on wire sizes.

• **Main and sub-feed breakers (in-lbs):**

Wire size AWG	No. of wires	Slotted head screw		Socket head screw	
		Over 1/4" slot length	1/4" & less slot length	3/16" socket	5/32" socket
14-10	1	35	20		
8	1	40	25		
6	1	45	35	120	100
4	1	45	35	120	100
3	1	50	35	120	100
2	1	50	40	120	100
1	1	50		120	100
1/0	1	50		120	100
2/0	1	50		120	100
3/0	1	50		120	100
4/0	1	50		120	100

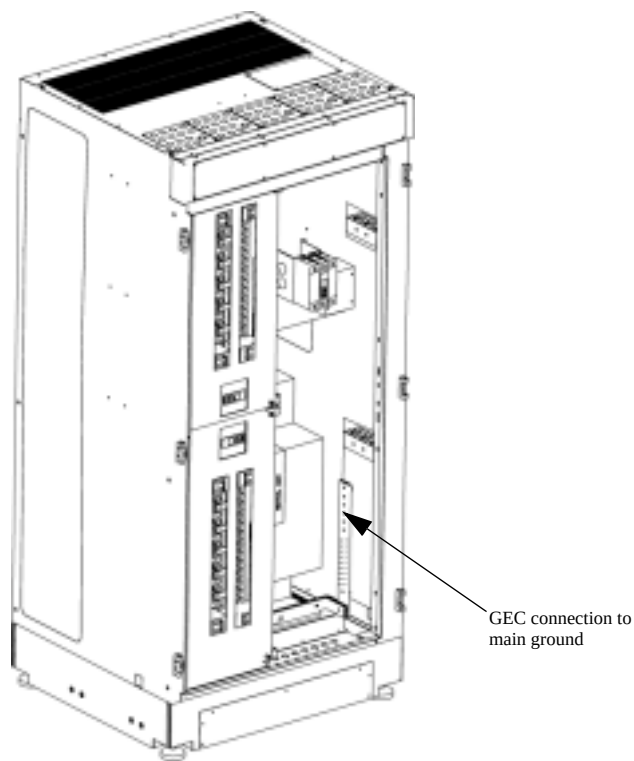
• **Panel board breakers (in-lbs):**

Wire size AWG	No. of wires	Torque (in-lbs)
14 - 10	1	20
8	1	25
6 - 4	1	27
3 - 1/0	1	45

Grounding electrode conductor (GEC). Prior to making any electrical wiring connections, a grounding electrode conductor (GEC) must be connected from the SPDU's main ground busbar to the facility's grounding electrode. NEC Table 250-66 provides recommended GEC sizing based on your SPDU's operational capacity. While conduit is not a requirement, the GEC connection must be protected from damage. A cable tray, raceway, or cable sheath are alternative safeguards.

The GEC connection to the SPDU's main ground busbar is accomplished with a (provided) box type wire connector. The GEC connection to the facility's grounding electrode can be made by exothermic welding, listed lugs, listed pressure connectors or some other NEC-specified means. Regardless of the method used, the GEC connection must be made in a manner that is both permanent and effective.

The main ground busbar in the SPDU is located in the lower-right corner of the enclosure (when facing the unit). See graphic below for the exact location.



SPDU (and sidecar) input connections. Input connections are made to the three termination points at the top of each input breaker (main circuit breaker, panel board breakers, and sub-feed breakers) in phase sequence A-B-C (L1, L2, L3).

For those SPDUs equipped WITH a transformer, the main input feeder consists of the 3-phase conductors and one ground conductor (3W+G). For SPDUs WITHOUT a transformer, the main input feeder consists of the 3-phase conductors, one neutral conductor, and one ground conductor (4W+G).

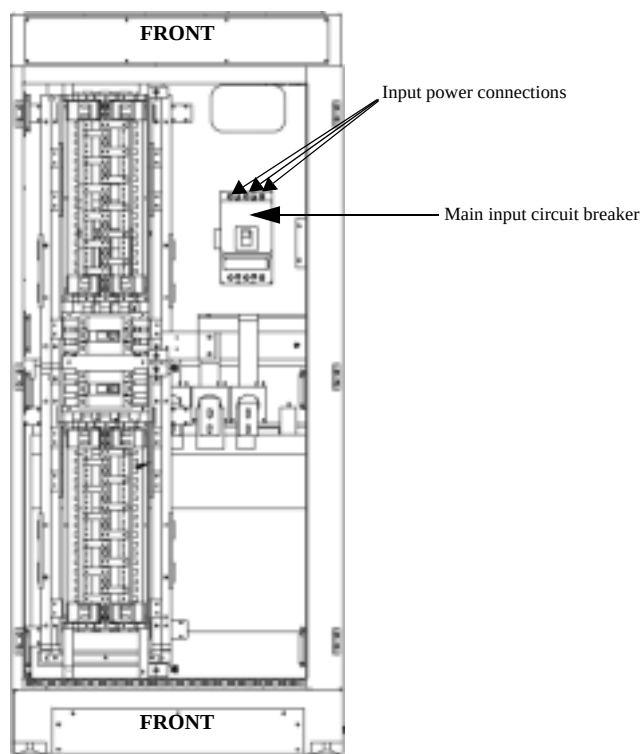
Conductors to the main input circuit breaker should enter:

- through the main plate on top of the SPDU (for top entry), or
- through a removable connector plate at the bottom of the SPDU (for bottom entry).

The A-B-C connections are made left-to-right to the positions shown in the graphic below. The Ground connection (green) goes to the vertical bar on the FAR left side of the breaker. The Neutral connection (white) goes to the vertical bar nearer to the breaker.

Conductors to the panel board and sub-feed breakers should enter through knockouts in the connector plates at the bottom of the enclosure. Both of these breaker types have been rotated 90° counter clockwise, and therefore the A-B-C connections on them are made from top-to-bottom. The Neutral connection (white) goes to the vertical bar on the FAR left side of the breaker. The Ground connection (green) goes to the vertical bar nearer to the breaker.

Refer to “Wiring considerations” on page 17 for conductor size, and then refer to appropriate “Torque values” on page 19.



SPDU (and sidecar) output connections. The following instructions for making output connections are applicable to the SPDU and each of its attached sidecars.

1. Install a distribution breaker

- a. Unlock and open the front door(s) of the enclosure.
- b. Open the hinged panel(s) to gain access to the panel boards.
- c. Select the next available breaker position(s) in either the upper or lower panel board, then snap the new single-, double-, or triple-pole breaker into the appropriate guard rail.



Note

The top pole of a triple-pole breaker must always be placed in an L1 position on the panel board. These are positions 1, 7, 13, 19, etc. on the left side and positions 2, 8, 14, 20, etc. on the right side of the board.

- d. Make bolt-on connections, if required (some breakers are simplified snap-in models, negating the need for this step). Torque screws to 25 in-lbs.



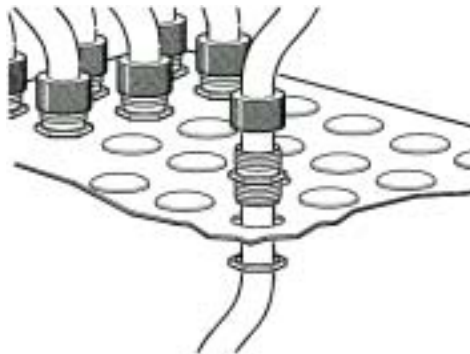
Note

There is one bolt-on connection for a single-pole breaker, two for a double-pole breaker, and three for a triple-pole breaker.

- e. Remove the corresponding plastic blanking plate on the appropriate hinged panel.

2. Install an output cable (or whip)

- a. Attach a strain relief connector bushing to the cable as shown in the below graphic. Slide enough cable through the strain relief connector to reach the intended distribution breaker.



- b. Apply the strain relief connector to the next available knockout on the roof of the cabinet and tighten in place.



Note

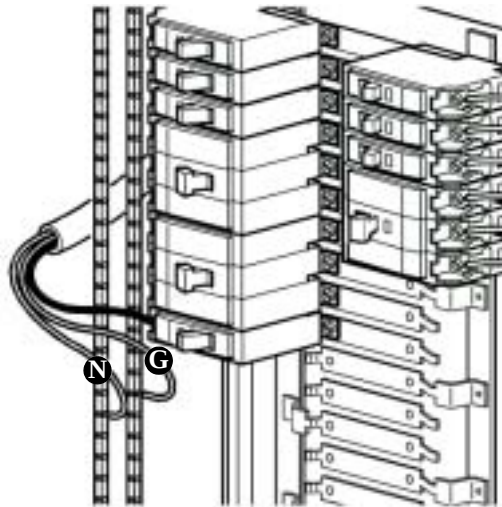
- **To avoid cable congestion, start with the knockouts located toward the front and center of the enclosure and work outward.**
- **If the cable is thicker than the standard 3/4" size, use a Greenlee punch (or equivalent) to enlarge the size of the knockout. Use appropriate hardware.**

3. Connect the cable to the distribution breaker

The cable's individual wires are connected to the distribution breaker's bolt-on or snap-in position(s); the neutral bar, if necessary; and the ground bar. Torque to 25 in-lbs.

– *When connecting a 3-wire cable to a single-pole breaker:*

- a. Connect the L1 wire (black) to the breaker's one load-side termination point.
- b. Connect the Neutral wire (white) to any open termination point on one of the neutral bars. These are the vertical bars located to the far left and far right of the panel boards.
- c. Connect the Ground wire (green) to any termination point on one of the ground bars. These are the vertical bars located nearer to the panel boards.



– *When connecting a 3-wire cable to a double-pole breaker:*

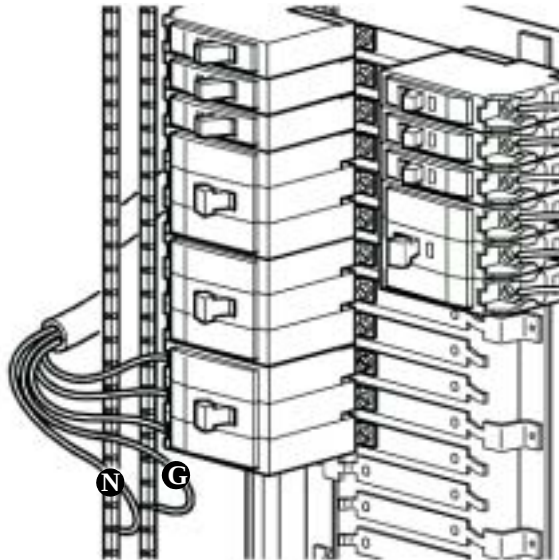
- a. Connect the L1 wire (black) and Neutral wire (white) to the breaker's two load-side termination points.
- b. There is no Neutral connection in this configuration.
- c. Connect the Ground wire (green) to any open termination point on one of the ground bars. These are the vertical bars located nearer to the panel boards.

– *When connecting a 4-wire cable to a double-pole breaker:*

- a. Connect the L1 wire (black) and L2 wire (red) to the breaker's two load-side termination points.
- b. Connect the Neutral wire (white) to any open termination point on one of the neutral bars. These are the vertical bars located to the far left and far right of the panel boards.
- c. Connect the Ground wire (green) to any open termination point on one of the ground bars. These are the vertical bars located nearer to the panel boards.

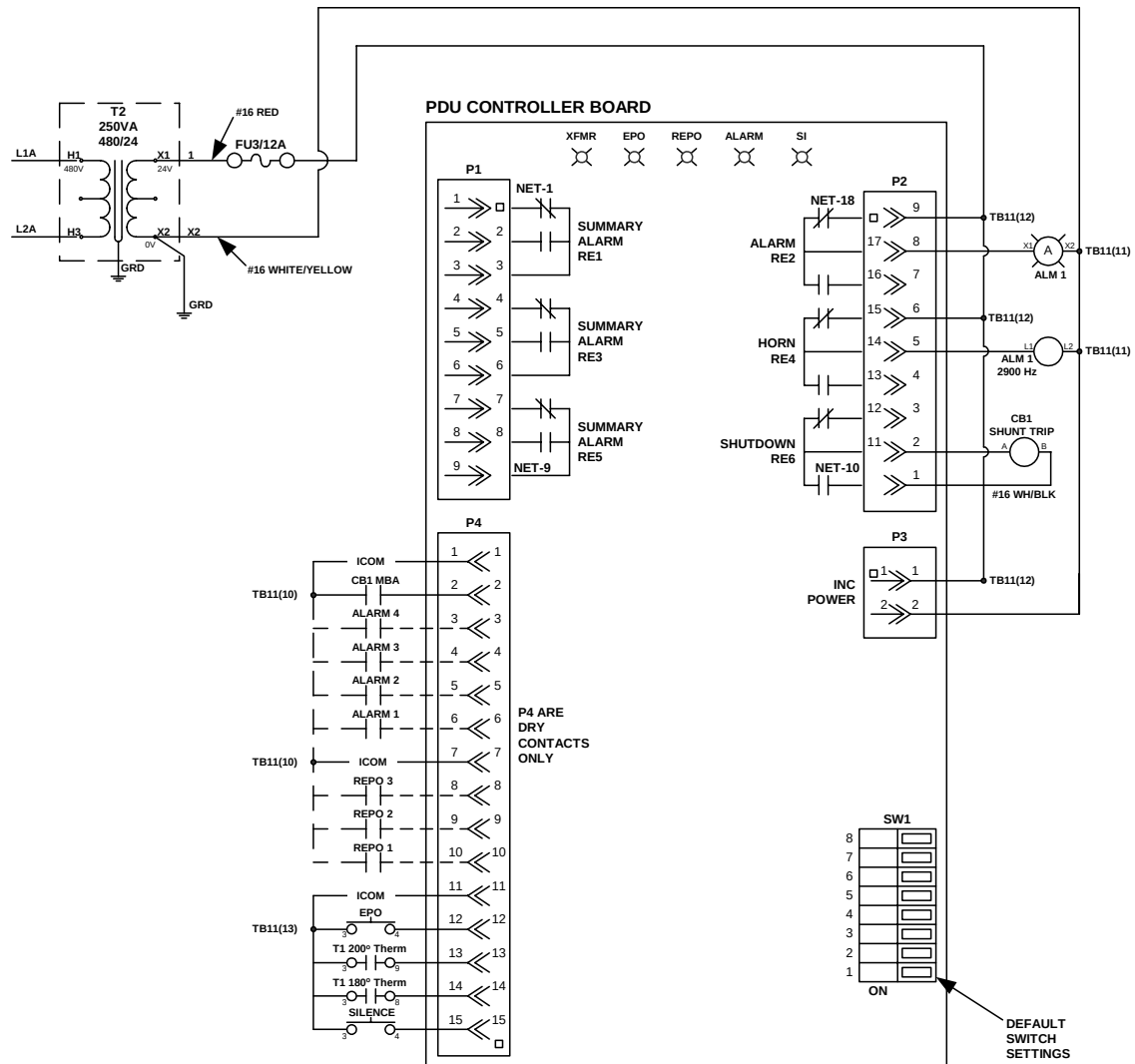
- *When connecting a 4-wire cable to a triple-pole breaker:*
 - a. Connect the L1 wire (black), L2 wire (red), and Neutral wire (white) to the breaker's three load-side termination points.
 - b. There is no Neutral connection in this configuration.
 - c. Connect the Ground wire (green) to any open termination point on one of the ground bars. These are the vertical bars located nearer to the panel boards.

- *When connecting a 5-wire cable to a triple-pole breaker:*
 - a. Connect the L1 wire (black), L2 wire (red), and L3 wire (orange) to the breaker's three load-side termination points.
 - b. Connect the Neutral wire (white) to any open termination point on one of the neutral bars. These are the vertical bars located to the far left and far right of the panel boards.
 - c. Connect the Ground wire (green) to any open termination point on one of the ground bars. These are the vertical bars located nearer to the panel boards.



SPDU control wiring. The control wiring terminal block is located near the top frame of the SPDU, directly above the main input circuit breaker. Refer to the diagram below for the proper wiring termination points in the block.

The recommended wire type is TEW/TW/MTW, with a size range of from #20-14 AWG. Strip enough insulation from each wire to achieve connection to the SPD terminal block, then secure the wire with a small standard screwdriver. Torque to 4.5-6 in-lbs.



SW1 SETTINGS			
SW	Designation	ON	OFF
8	Manual Restart	Enabled	Disabled
7	REPO #3	N.C. INPUT	N.O. INPUT
6	REPO #2	N.C. INPUT	N.O. INPUT
5	REPO #1	N.C. INPUT	N.O. INPUT
4	ALARM #4	SHUTDOWN	ALARM
3	ALARM #3	SHUTDOWN	ALARM
2	ALARM #2	SHUTDOWN	ALARM
1	ALARM #1	SHUTDOWN	ALARM

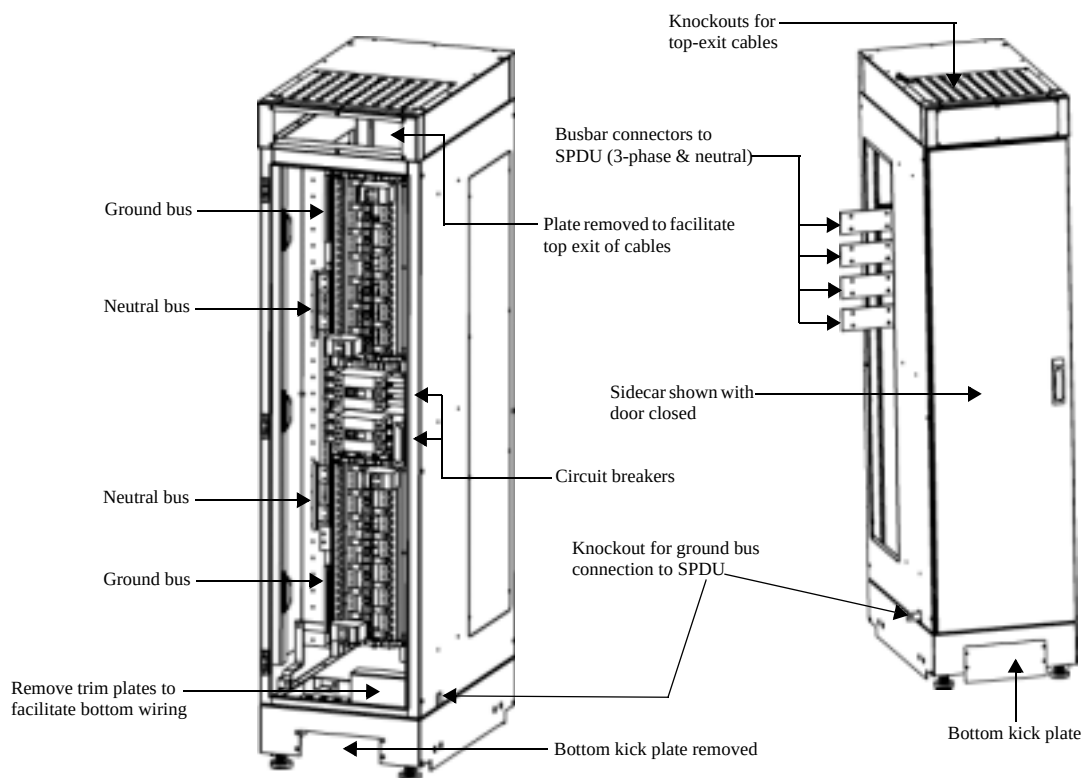
Sidecar Installation

Sidecar characteristics

The SPDU's load distribution capability can be increased through the addition (attachment) of optionally ordered sidecars. At the customer's discretion, each sidecar can be equipped with either one or two 42-pole panel boards. Sidecars can be connected (via busbar) to either side of the SPDU and daisy chained, if necessary. Like the SPDU, the sidecar offers top and bottom knockout plates to accommodate incoming cables.

Sidecars for the 75-225[K13] kVA units measure 20" W x 32"D x 81.5"H [51 cm x 81 cm x 207 cm] and weigh 520 lbs [254 kg]. Sidecars for the 225[K20] unit and all 300 kVA units measure 20" W x 38.5"D x 81.5"H [51 cm x 98 cm x 207 cm] and weigh 590 lbs [268 kg].

The 5.5-inch [14 cm] top box can be removed to reduce the unit's height during transport to 76" [193 cm]. Refer to "Top box removal" on page 10.



Connecting sidecars to the SPDU

General information.

- When shipped mechanically assembled to the SPDU, the sidecar is already electrically connected (via busbar) as well. The busbar connections accommodate both power and ground.
- When shipped separately, the sidecar contains splice kits and mounting hardware for connecting its busbar to the busbar in the SPDU. The following procedure describes how to connect a sidecar to the SPDU (WITH or WITHOUT transformer).

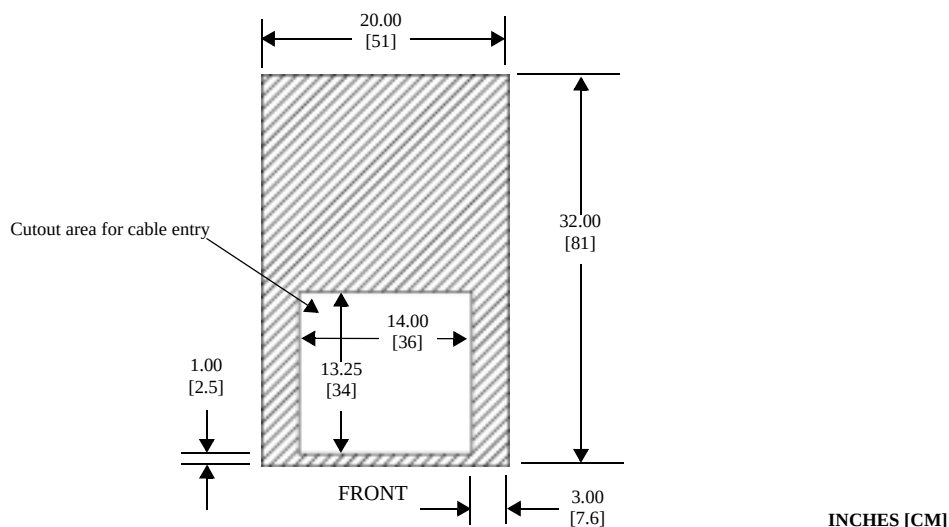


Ensure that NO ELECTRICAL POWER SUPPLY is connected to the SPDU, and that ALL BREAKERS in both units are in the OFF position.

Step-by-step procedure.

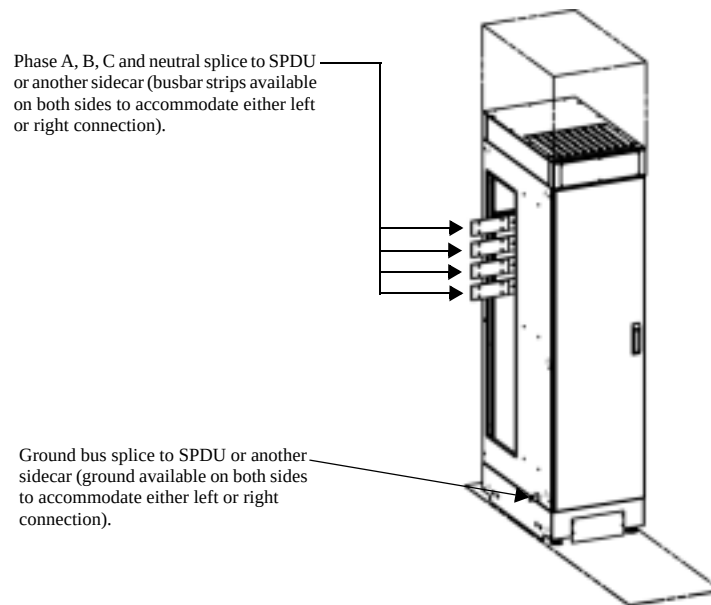
1. Decide where the sidecar will be placed in relation to the SPDU (left or right side) and prepare the appropriate floor cutout(s), if necessary. Floor jacks or a full-frame floor stand (both are described on page 6) might optionally be used to attain recommended bottom clearance.

The cutout for the 75-225[K13] kVA sidecars is shown below. The cutout for the 225[K20] sidecar and all 300 kVA sidecars is provided, as needed, with the Installation Drawings.



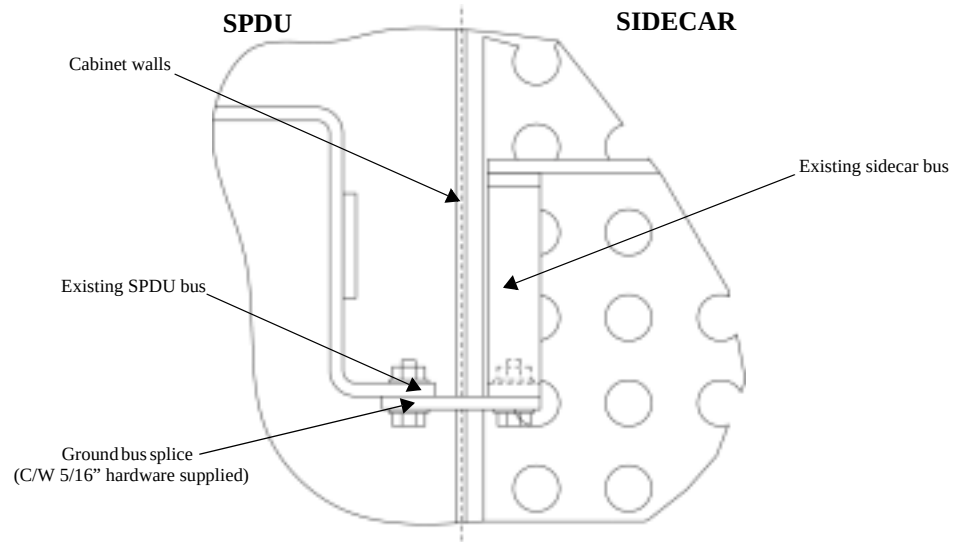
Make sure cutouts do not compromise the structural integrity of the floor, and that loading requirements remain acceptable to the installation.

2. Open the front door of the sidecar using the same procedure outlined in “Front doors” on page 15. Behind the front door is one large hinged panel that is opened by loosening its top and bottom turn screws. Retrieve the busbar splice plates and hardware inside the unit.
3. Using a Phillips screwdriver, remove a) the adjacent side panel on the SPDU; and b.) both side panels on the sidecar. The latter action will permit better access for accomplishing the busbar connections described later.
4. Place the sidecar in close proximity to where it will be attached to the SPDU. Take care to avoid casters falling through the floor cutout.
5. Adjust the sidecar’s height to match the height of the SPDU. This is accomplished by either extending or extracting the leveling feet (or adjusting the floor jacks or floor stand).
6. Align the (8) facing assembly holes on the side of the sidecar with the (8) facing assembly holes on the side of the SPDU.
7. Using a wrench, thread (8) 5/16 x 3/4” bolts through the sidecar’s holes to pre-set weld nuts located in the SPDU’s holes. Bind until rigid.
8. Position the (4) busbar splice plates (3-phase power and neutral) between the (4) busbar strips protruding through the open side panels of both the SPDU and the sidecar.



9. Using a wrench, thread (4) 1/4 x 20 x 1” bolts through each splice plate and into pre-set press nuts in the busbar protruding from both enclosures. Torque to 11 ft-lbs.
10. Reinstall the sidecar’s external side panel.

11. Connect the ground busbar (refer to “Internal components” on page 3 and the step 8 graphic on page 28 for location of ground bus) using the (2) angled splice plates. Three 1/4 x 20 x 1” bolts are required. Torque to 6 ft-lbs.



12. Reinstall the sidecar's external side panel.

Connecting sidecars to sidecars



Ensure that NO ELECTRICAL POWER SUPPLY is connected to the SPDU, and that ALL BREAKERS in both units are in the OFF position.

Step-by-step procedure. The procedure for connecting sidecars to sidecars (in a daisy chained alignment) is very similar to the procedure for connecting sidecars to the SPDU. Refer to the diagrams in the previous section for any visual support required.

1. Depending on where each sidecar will be positioned in relation to the SPDU, prepare the appropriate floor cutouts (if necessary) as per the step 1 graphic on page 27. Floor jacks or a full-frame floor stand (both are described on page 6) might be used to attain bottom clearance.



Make certain cutouts do not compromise the structural integrity of the floor, and that loading requirements remain acceptable to the installation.

2. Open the front door of the add-on sidecar using the same procedure outlined in “Front doors” on page 15. Behind the front door is one large hinged panel that is opened by loosening its top and bottom turn screws. Retrieve the busbar splice plates and hardware inside the unit.
3. Using a Phillips screwdriver, remove a) the exposed side panel of the previously installed sidecar; and b) both side panels on the add-on sidecar. The latter action will permit better access for accomplishing the busbar connections described later.
4. Place the add-on sidecar in close proximity to where it will be attached to the previously installed sidecar. Take care to avoid casters falling through the floor cutout.
5. Adjust the add-on sidecar’s height to match the height of the other sidecar. This is accomplished by extending or extracting the leveling feet (or adjusting the floor jacks or floor stand).
6. Align the (8) facing assembly holes on the side of the add-on sidecar with the (8) facing assembly holes on the side of the previously installed sidecar.
7. Bind the sides of the two sidecars rigidly together using a wrench with (8) 5/16 x 1.25 hex bolts, (16) 5/16 washers and (8) 5/16 hex nuts.
8. Position the (4) busbar splice plates (3-phase power and neutral) between the (4) busbar strips protruding through the open side panels of both sidecars.
9. Using a wrench, thread (4) 1/4 x 20 x 1” bolts through each splice plate and into pre-set press nuts in the busbar protruding from both enclosures. Torque to 11 ft-lbs.
10. Connect the ground busbar (refer to step 10 on page 29) using the (2) angled splice plates. Three 1/4 x 20 x 1” bolts are required. Torque to 6 ft-lbs.
11. Reinstall the add-on sidecar’s external side panel.

Appendix A: Electrical Checklist



- **ONLY QUALIFIED PERSONNEL are permitted to perform any task or function associated with this equipment!**
- **Ensure that NO ELECTRICAL POWER SUPPLY is connected and that ALL BREAKERS are in the OFF position before installing or servicing the SPDU!**

- ☐ 1. Confirm that clearances for cabling, service access and ventilation correspond to specifications. There should be a minimum of 18" ABOVE the unit, 6" BELOW it, and 36" in FRONT.
- ☐ 2. Remove front doors and interior trims as required. Note that panel on side of enclosure facilitates manufacturing and should NOT have to be removed during SPDU installation. All ground straps must be disconnected from trims prior to removing them from enclosure.
- ☐ 3. Confirm that all main, secondary, and branch circuit breakers are in the 'OFF' position.
- ☐ 4. Inspect all wire and conductor insulation for damage.
- ☐ 5. Check all transformer and breaker connections for tightness, and re-torque if necessary.
- ☐ 6. Check all terminal block connections for tightness, and re-torque if necessary.
- ☐ 7. Verify that all cables meet or exceed specified conductor sizes.
- ☐ 8. Remove all foreign objects from interior of SPDU. The intake and exhaust air screens must be clean and clear of obstruction. Air passages above, below and behind power transformer must likewise be clear of obstruction.
- ☐ 9. Ensure floor cutouts correspond to the step 1 graphic on page 13, the step 1 graphic on page 27, or as specified in the Installation Drawings.
- ☐ 10. Verify input connections to main circuit breaker, equipment grounding, and grounding of electrode conductors.
- ☐ 11. Turn ON utility-supplied input power to the SPDU.
- ☐ 12. Check phase rotation on main input circuit breaker. Phase rotation should be A, B, C, left-to-right.

- ☐ 13. Verify and record INPUT voltages on the main input circuit breaker.
 - a. Volts, Phase A-B:
 - b. Volts, Phase B-C:
 - c. Volts, Phase C-A:
 - d. Volts, Phase A-N:
 - e. Volts, Phase B-N:
 - f. Volts, Phase C-N:
- ☐ 14. If input voltage is incorrect, check for wiring errors or improper transformer tap upstream of the SPDU.
- ☐ 15. If main input breaker trips within (1) minute of turn on, contact APC Services or a factory rep for assistance. Check phase rotation (on line side of terminals) in each panel board's main breaker and sub-feed breakers. Rotation should be A, B, C, top-to-bottom. Note that main panel breaker and sub-feed breakers have been rotated 90 degrees, counter-clockwise.
- ☐ 16. Check Alarm circuitry by placing a jumper between terminals TB1-2 and TB1-13 in the control section above the main breaker. Horn will sound, pilot light illuminate, summary alarm K2, and control relay K1 energize. Press the Silence Push button to de-activate the Horn, though the alarm will remain lit. Remove the jumper and the alarm will automatically reset.
- ☐ 17. Check EPO / 200°C Transformer thermal trip circuits by placing a jumper between terminals TB1-2 and TB1-8 in control section. This energizes main breaker's shunt trip, tripping the breaker. Horn will sound, pilot light illuminate, summary alarm K2 and control relay K1 energize. Remove the jumper and the alarm will clear. Reset breaker and REPEAT test by depressing local EPO push button. REPEAT for each remote EPO in the system. Note the control circuit will be energized, even though main breaker is in the trip or off position.
- ☐ 18. Check Manual Restart (if supplied) by placing selector switch on control panel in the ON position. De-energize control circuitry by removing Fuse FU3. Upon detecting a power failure, the shunt trip in the main breaker energizes and trips the breaker. Replace the fuse and put selector switch in position that matches customer requirements.
- ☐ 19. If a Normally Closed Remote Emergency Power Off (REPO) is used, remove the jumper between TB1-23 and TB1-24. Wire dry contacts from REPO circuits to these terminals. Depress remote push button. Control relays K3 and K4 will de-energize, activating the shunt trip and tripping the main breaker. Reset breaker and test for each REPO in the system.

Appendix B: Specifications/Data

SPDU product specification

Input		Output	
Rated Power kVA:	75, 100, 125, 150, 200, 225, 300	Nominal Output Voltage:	208V/120V
Nominal Input Voltage:	60 Hz @ 208V/480V/600V	Distribution Panel (choice of):	- Two panel boards
K Factor:	K1, K13, K20		- One panel board and up to seven 225A sub-feed breakers
Efficiency at Full Load:	96.5-98%		- One panel board and up to three 400A sub-feed breakers
Harmonic Distortion:	< 1%		- Up to eleven 225A sub-feed breakers
Nominal Impedance:	3-5%		
Main Input Breaker*:	65,000 AIC @ 208; 35,000 @ 480V; 18,000 @ 600V		

Environmental		Physical	
Operating Temperature:	0-40°C (32-104°F)	Max. Height Dimension:	81.5 in (207.01 cm), with removable 5.5-in. (13.97) top hat
Operating Rel. Humidity:	0-95% non-condensing	Max. Width Dimension:	36 in (91.44 cm) up to 225 kVA 45 in (111.76 cm) for 300 kVA
Audible Noise:	Less than ANSI C89 Standard for Transformers	Max. Depth Dimension:	32 in (81.28 cm) up to 225 kVA 38.5 in (98 cm) for 300 kVA
Protection Class:	NEMA 1	Color:	Black
UL Certification:	UL60950	Units per pallet:	1 SPDU with max. two sidecars

* Other kAIC ratings are available to accommodate specific customer requirements.

SPDU with one sidecar

Product SKU	Width		Depth		Height		Weight	
	IN	CM	IN	CM	IN	CM	LB	KG
PD75G6FK1	56	142	32	81	81.5	207	1790	812
PD75G6FK13	56	142	32	81	81.5	207	1840	835
PD75G6FK20	56	142	32	81	81.5	207	1860	844
PD100G6FK1	56	142	32	81	81.5	207	2045	928
PD100G6FK13	56	142	32	81	81.5	207	2070	939
PD100G6FK20	56	142	32	81	81.5	207	2215	1005
PD125G6FK1	56	142	32	81	81.5	207	2070	939
PD125G6FK13	56	142	32	81	81.5	207	2120	962
PD125G6FK20	56	142	32	81	81.5	207	2235	1014
PD150G6FK1	56	142	32	81	81.5	207	2110	957
PD150G6FK13	56	142	32	81	81.5	207	2220	1007
PD150G6FK20	56	142	32	81	81.5	207	2480	1125
PD200G6FK1	56	142	32	81	81.5	207	2420	1098
PD200G6FK13	56	142	32	81	81.5	207	2620	1188
PD200G6FK20	56	142	32	81	81.5	207	2620	1188
PD225G6FK1	56	142	32	81	81.5	207	2620	1188
PD225G6FK13	56	142	32	81	81.5	207	2820	1279
PD225G6FK20	56	142	38.5	98	81.5	207	2940	1334
PD300G6FK1	65	165	38.5	98	81.5	207	2890	1311
PD300G6FK13	65	165	38.5	98	81.5	207	3290	1492
PD300G6FK20	65	165	38.5	98	81.5	207	3490	1583

SPDU with two sidecars

Product SKU	Width		Depth		Height		Weight	
	IN	CM	IN	CM	IN	CM	LB	KG
PD75G6FK1	76	193	32	81	81.5	207	2310	1048
PD75G6FK13	76	193	32	81	81.5	207	2360	1070
PD75G6FK20	76	193	32	81	81.5	207	2380	1080
PD100G6FK1	76	193	32	81	81.5	207	2565	1163
PD100G6FK13	76	193	32	81	81.5	207	2590	1175
PD100G6FK20	76	193	32	81	81.5	207	2735	1241
PD125G6FK1	76	193	32	81	81.5	207	2590	1175
PD125G6FK13	76	193	32	81	81.5	207	2640	1197
PD125G6FK20	76	193	32	81	81.5	207	2755	1250
PD150G6FK1	76	193	32	81	81.5	207	2630	1193
PD150G6FK13	76	193	32	81	81.5	207	2740	1243
PD150G6FK20	76	193	32	81	81.5	207	3000	1361
PD200G6FK1	76	193	32	81	81.5	207	2940	1334
PD200G6FK13	76	193	32	81	81.5	207	3140	1424
PD200G6FK20	76	193	32	81	81.5	207	3140	1424
PD225G6FK1	76	193	32	81	81.5	207	3140	1424
PD225G6FK13	76	193	32	81	81.5	207	3340	1515
PD225G6FK20	76	193	38.5	98	81.5	207	3460	1569
PD300G6FK1	85	216	38.5	98	81.5	207	3480	1579
PD300G6FK13	85	216	38.5	98	81.5	207	3880	1760
PD300G6FK20	85	216	38.5	98	81.5	207	4080	1851

Full load heat output (BTU/hr)

Product SKU	BTU/Hour	kW
PD75G6FK1	12276	3.60
PD75G6FK13	11253	3.30
PD75G6FK20	10912	3.20
PD100G6FK1	15004	4.40
PD100G6FK13	13640	4.00
PD100G6FK20	13129	3.85
PD125G6FK1	20631	6.05
PD125G6FK13	17732	5.20
PD125G6FK20	13299	3.90
PD150G6FK1	22506	6.60
PD150G6FK13	17391	5.10
PD150G6FK20	16368	4.80
PD200G6FK1	24723	7.25
PD200G6FK13	20290	5.95
PD200G6FK20	18926	5.55
PD225G6FK1	28133	8.25
PD225G6FK13	22847	6.70
PD225G6FK20	22165	6.50
PD300G6FK1	32736	9.60
PD300G6FK13	26854	7.88
PD300G6FK20	26257	7.70

Control fuses/supplementary protectors

Meter/Control	Fuse Designation	Description	Rating	Fuse Cat. No. (1) Supplementary Protector
Control	FU1	Primary of Control Transformer	2A	FNQ-2
Control	FU2	Primary of Control Transformer	2A	FNQ-2
Control	FU3	Secondary of Control Transformer	10A	FNQ-12
IQ300	IQ-CB	V _a Input for IQ300 Meter	2A	WMS2C02

Appendix C: Monitoring

Basic monitoring

- The Basic monitoring package consists of an EPO Push button, a Horn, an Alarm Light, an Alarm Silence Push button, a Summary Alarm Relay, and Power Transformer High Temperature Thermostats (located in each coil).
- The Power Transformer's thermostat is set at 180°C. Should the Transformer reach or exceed this temperature, the Horn and Alarm Light become activated. The Summary Alarm Relay is also activated.
- Depressing the Silence Push button silences the Horn. However, the Alarm Light remains on for as long as the alarm condition continues. Note that the Horn cannot be reactivated until the existing alarm(s) have been cleared.
- The EPO (Emergency Power Off) Push button is located behind a protective cover. To shut down the SPD, lift the cover and push this button. This energizes the main input circuit breaker's shunt trip, causing the breaker to trip and the SPD to de-energize.
- If connected, the External Alarm Circuit can also activate the Horn and the Alarm Light.
- The Power Transformer contains an additional thermostat set at 200°C. Should the Transformer reach or exceed this temperature, the shunt trip activates and subsequently de-energizes the main input circuit breaker.
- If any of the Transformer's temperature alarms are activated, the entire system should be examined to first determine and then resolve the problem.
- Terminals are provided to accommodate the Remote EPO Circuit, the External Alarm Circuit and the HVAC Shutdown Circuit. Refer to the schematic for details.

Advanced or premium monitoring

Advanced tools are available in several versions, and can be employed for further monitoring of the SPD. If the unit is shipped with Advanced or Premium monitoring functionality, the instruction manual for that level of metering will be included in the documentation package.

Appendix D: Abbreviations and Acronyms

A:	Amps
AIC:	Amps Interrupting Capacity
ANSI:	American National Standards Institute
APC:	American Power Conversion
AWG:	American Wire Gauge
BTU:	British Thermal Unit
C:	Centigrade
CM:	Centimeters
C/W:	Comes With
D:	Depth
EPO:	Emergency Power Off
F:	Fahrenheit
FLA:	Full Load Amps
FT:	Foot
GEC:	Grounding Electrode Conductor
H:	Height
HZ:	Hertz
HVAC:	Heating, Ventilation and Air Conditioning
IEC:	International Electrotechnical Commission
IEEE:	Institute of Electrical and Electronic Engineers
IN:	Inch
KVA:	Kilovolt Amps
LBS	Pounds
MCM:	Thousands (M) of Circular Mills (commonly referred to as “Kcmil”)
NEC:	National Electrical Code
NEMA:	National Electrical Manufacturers Association
NFPA:	National Fire Protection Association
PDU:	Power Distribution Unit
REPO:	Remote Emergency Power Off
SPDU:	Stationary Power Distribution Unit
TVSS:	Transient Voltage Suppression System
UL:	Underwriters Laboratories
USFDA:	United States Food and Drug Administration
V:	Volts
W:	Width

Life Support Policy/Warranty

Life support policy

American Power Conversion Corporation (APC) and its affiliates and subsidiaries worldwide do not recommend the use of any of their products in life-support applications where failure or malfunction of the APC product can be reasonably expected to cause failure of the life-support device or to significantly affect its safety or effectiveness. APC does not permit the use of any of its products in direct patient care. APC will not knowingly sell its products for use in such applications unless the life-support system or direct patient care device is part of a whole facility/building into which the UPS is integrated, and unless APC receives, in writing, assurances satisfactory to APC that:

- a. The UPS system will be configured in a manner that will provide N+1 power redundancy to the critical load,
- b. The end-user customer assumes all risks and signs the *APC System Configuration and Use Form*, and
- c. The customer and operators of the APC UPS system agree to indemnify and hold APC and its affiliates and subsidiaries harmless for any and all claims arising out of the systems use in such applications.

The term *life-support device* includes but is not limited to neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), autotransfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators (for adults and infants), anesthesia ventilators, infusion pumps, and any other devices designated as “critical” by the U.S. FDA.

Hospital-grade wiring devices and leakage current protection may be ordered as options on many APC UPS systems. APC does not claim that units with these modifications are certified or listed as hospital-grade by APC or any other organization. Therefore these units do not meet the requirements for use in direct patient care.

Factory warranty

APC warrants that the unit, when properly installed and commissioned by APC or APC authorized service personnel, shall be free from defects in materials and workmanship for a period of (1) year from the date of installation or maximum 18 months after manufacturing. In the event that the unit fails to meet the foregoing warranty, APC shall for a period of one (1) year repair or replace any defective parts, without charge for on-site labor and travel if trained & authorized APC personnel has conducted start-up of the unit.

An APC Start-Up Service must be performed/completed by APC or by service personnel authorized by APC. If not, the on-site factory warranty will be voided and replacement of defective parts only will be covered. APC shall have no liability and no obligation to repair the installed unit if non-authorized APC personnel performed the start-up and such start-up caused the unit to be defective.

APC shall not be liable under the warranty if its testing and examination disclose that the alleged defect in the product does not exist or was caused by purchaser's or any third person's misuse, negligence, improper installation or testing, unauthorized attempts to repair or modify, or any other cause beyond the range of the intended use, or by accident, fire, lightning or other hazard.

There are no warranties, expressed or implied, by operation of law or otherwise, of products sold, serviced or furnished under this agreement or in connection herewithin. APC disclaims all implied warranties of merchantability, satisfaction and fitness for a particular purpose. APC's express warranties will not be enlarged, diminished, or affected by and no obligation or liability will arise out of, APC rendering of technical or other advice or service in connection with the products. The foregoing warranties and remedies are exclusive and in lieu of all other warranties and remedies. The warranties set forth above, constitute APC's sole liability and purchaser's exclusive remedy for any breach of such warranties. APC's warranties apply only to purchaser and are not extended to any third parties.

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 - **www.apc.com** (Corporate Headquarters)
Connect to localized APC Web sites for specific countries, each of which provides customer support information.
 - **www.apc.com/support/**
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- Contact an APC Customer Support center by telephone or e-mail.
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APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702020 (Ireland)
Japan	(0) 35434-2021
Australia, New Zealand, South Pacific	(61) (2) 9955 9366 (Australia)

- Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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